Engaging Society in Pig Research

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9. Engaging Society in Pig Research. Lessons learned on how to facilitate multi-stakeholder dialogues to enhance animal welfare in pig production

Animal welfare in pig production is sensitive in nature and frequently topic of debate. To create solutions that match the diversity of societal perspectives, a transdisciplinary research approach is stated to be the right strategy. In here, mutual learning among diverse stakeholders within science and society is facilitated.

We experimented for four years with various types of learning interventions as part of a transdisciplinary research program on animal welfare improvement in pig production. We present our lessons learned on how to organize the process of mutual learning between animal researchers and societal stakeholders.

We in particularly take into account how to deal with the wickedness and the sensitivity of the issue at stake in its design. Lesson 1: Learning interventions are most successful when different perspectives are used to problematize the issue at stake and to create an eye-opening effect. Lesson 2: Second-order learning might be better or faster realized by a shared reflection on first-order notions. Learning processes may profit from frequent mutual visits to each other's professional environment and dialogue sessions at a material level. This helps to make differences explicit and difficult to ignore and to escape from. Lesson 3: A fair share of the responsibilities and integrated solutions is needed to engage participants in dialogue.

9.1 Introduction

In 2009 the four year Dutch research program *Seeking Sociable Swine* started, which was directed to animal welfare in pig production. Involved were geneticists, animal behaviour researchers and transdisciplinary researchers. They studied how social behaviour of pigs can be improved in coherence with societal acceptance. Social pig behaviour relates not only to pig welfare, but also to productivity and societal relevant themes as tail biting and the

keeping of undocked pigs in the near future. The researchers were in particular interested in the potential of a new breeding strategy in improving social pig behaviour. Whereas breeding to date has generally focussed on the performance of the individual animal, this new breeding method includes the genetic effects that an individual has on the growth performance of its group mates. Potentially, these social genetic effects are associated with social interactions. Undesired aggression of pigs might be replaced by positive social interactions: a balanced improvement of welfare and production might be achieved.

Exploration through in-depth interviews and focus groups showed that, among others, non-researchers appeared to be concerned that economic motives are the main drivers behind this research strategy, instead of the expressed motives of improving animal welfare. In addition, the approach to include social interactions in breeding was perceived as an end-of-pipe solution and an implicit acceptation of the intensive pig husbandry. These results indicated potentially irresolvable value conflicts between the stakeholders and researchers involved (Benard & De Cock Buning, 2010).

Scientific insights and technological innovations are important contributors to the improvement of animal welfare. However, they are often contested or insufficient for solving animal welfare problems in which many variables are entangled and the context is of major influence. To stimulate the building of shared solutions for complex issues such as animal welfare improvement in pig production, a transdisciplinary research approach is required, in which mutual learning among diverse stakeholders within science and society is facilitated (Scholz, 2000; Bruun et al., 2005; Bunders et al., 2010; Pohl, 2011).

There are not many studies of practical implementations that provide insights on how to organize such multi-stakeholders learning processes. Aiming to realise this challenge, we organized a four year multi-stakeholder learning process as part of the transdisciplinary research program. We studied the dynamics of mutual learning as effect of this learning process at a micro level and gained insights into the barriers and catalysts. In this paper, we take stock on earlier published research and analyse those in perspective over the total period of the four years. We present the lessons learned, on how to organize such processes, and specifically, how to deal with the wickedness and the sensitivity of the issue at stake in its design.

The lessons provide in particular insights into:

- How to design reflective learning sessions, aiming to open fixed patterns of thoughts?

- How to exchange knowledge between people with different framings and backgrounds?

9.1.1 Animal welfare as unstructured problem

Many animal welfare problems in animal production can be labelled as wicked (Rittel & Webber, 1973), complex, (Bos & Grin, 2008) or unstructured (Hisschemöller & Hoppe, 1995). These types of problems are difficult to solve because they are multi-causal and show an entanglement of social and wider contextual elements (e.g. consumption behaviours, market forces, governmental regulations) along with technical elements (e.g. available knowledge on animals). They are hard to separate from a wider circle of related problems, and the solutions provided frequently result in unintended consequences for other actors in animal production, such as the environment or consumers (Batie & Schweikhardt, 2010; Driessen, 2010).

Both within animal science and within society at large, there is no consensus on the prioritization of key values and on the relevance of facts at stake. Animal welfare has a multi-dimensional nature, covering several aspects such as health, positive emotions, natural behaviour, absence of stress, the lack of pain and discomfort (Fraser, 1997; Botreau et al., 2007; Hubbard & Scott, 2011; Miele et al., 2011). Consequently, it is studied from different disciplines, resulting in a diversity of (competing) definitions and related relevancies of criteria and norms (Fraser, 1997; Botreau et al., 2007; Hubbard & Scott, 2011). Different visions exist among stakeholders on what animal welfare aspects are most important for the welfare of the animal. The vision that people have on animal welfare and animal production is constructed according to their frames of reference. This is a frame that helps to make sense of complex realities. It provides a perspective to structure knowledge, position experiences and to judge and respond to issues (Schön & Rein, 1994). A frame of reference is based on the entire set of a person's norms, values, knowledge, convictions and interests (Te Velde et al., 2002).

9.1.2 Multi-stakeholder learning

Oversimplifying the problem by applying the common strategy of assigning only one group as experts regarding facts at stake (e.g. researchers) will lead to a reduction of the issue, a

failure in support, hence a persistent problem. Instead, mutual learning between stakeholders is essential to obtain a more sophisticated understanding of the problem. This increases the chance of success in creating solutions that match the diversity of societal perspectives (Hisschemöller & Hoppe, 1995). The value of mutual learning is also acknowledged by the German philosopher Gadamer (1965), who speaks about the *"fusion of horizons"*. Mutual learning reduces bias and prejudices caused by the framing of an individual and stimulates the merging of different views together thereby transforming the initial individual vision.

Schön and Rein (1994) argues that learning processes should aim a change in the frame of reference because it are differences in the underlying frames that causes different visions. They introduced the term frame reflection, which they defined as:

> "*to put themselves in the shoes of other actors in the environment (..) and to overcome the blindness induced by their own ways of framing the policy situation* (1994, p. 187)."

This type of learning is defined by Argyris and Schön (1978) as *second-order learning*, and originates from the research field of organizational learning. In first order-learning, actions are modified based on the differences between attempted and obtained outcomes. Underlying framings are taken for granted and reflection is done only within these framings. During usual practises, learning tends to be limited to this first-order level (Schön, 1983). In second-order learning is reflected upon (each other's) underlying framings, which is expected to lead to different goals, strategies or framings, and is stated by (Grin & van de Graaf, 1996) to be required for congruency between different actors and undertaking common action.

9.2 Methods

The research in this thesis had an action research approach. This approach is characterised by its dual aim: besides generating scientific knowledge, the research is problem oriented and functions to contribute to sustainable development (Regeer, 2010). The transdisciplinary researchers (authors of manuscript) were embedded in the research program. Their task was to accomplish a multi-stakeholder learning process in synchrony

with the animal and genetics research. This implies more than observing and interpreting; they actively took part in the process and organized interventions.

Action research means that the research is taking place in the real world, which is less predictable than a typical carefully designed experimental setting. The issues of stakeholders cannot be known in advance, circumstances can change and effects can be unexpected (Benard et al., 2010; Regeer, 2010). Multi-stakeholder learning processes need therefore a flexible cyclic design that is open to change, instead of a fixed and predefined approach (Burns et al., 2003; Zweekhorst, 2004; Hoes et al., 2008; Regeer, 2010). Observing and reflecting upon interventions enable the designing and planning of adequate follow-up tailor-made interventions.

The design of the multi-stakeholder process was tailor made for animal welfare improvement in pig husbandry, which stands at the same time as an example for controversial or *wicked* issues. The design of the multi-stakeholder learning process elaborated on the Interactive Learning and Action (ILA) approach (Broerse & Bunders, 2000). This approach has proven its effectiveness in broadening up the decision making on science and technology development and to be applicable in different research fields (Bunders et al., 2010). It has been tested, evaluated and adapted in various emerging research fields such as agenda setting of patients in health policy (Caron-Flinterman, 2005), responsible research and innovation like genomics (Kloet, 2011), synthetic biology (Betten et al., 2013) and neuroscience (Arentshorst et al., 2014).

The ILA-approach distinguishes five phases of consultation and deliberation, by the use of participatory methods as focus groups, in-depth interviews and dialogue sessions. These methods ensure active participation and learning among the researchers and stakeholders from the start of the process.

- Exploratory phase: Through literature study and exploratory interviews, the actors to be involved in the process are identified.
- In-depth study of needs and perspectives: Through various participatory data collection methods (e.g. interviews and focus groups), needs and visions are identified and analysed of the relevant researchers and stakeholders. On the one hand, insight is gained into their frame of reference and into the ethical and societal issues at stake, on the other hand, second-order learning is stimulated among the participants
- Integration: A number of heterogeneous dialogue sessions are organized to compare and analyse jointly the different perspectives at stake thereby inducing

frame reflection and stimulating mutual learning among stakeholders and researchers.

- Agenda setting and planning: Subsequent dialogue sessions are held to set priorities and to develop an action plan for different partners in the production chain to define options for socially embedded, responsible research.
- Implementation: The execution of the action plan and embedding of research plans.

The stakeholders that participated in this research can be divided in three categories, based on their degree of involvement in the *Seeking Sociable Swine* program: 1) the researchers; 2) the inner circle stakeholders; and 3) the outer circle stakeholders (see table 9.1). The first category includes the researchers involved in the research program. The second category included a panel of stakeholder representatives: farm branch, animal protection, pig breeding and food industry. This panel of representatives had committed themselves to the research program. To the outer circle stakeholders belong a broad range of stakeholders who were consulted by interview or focus group. They were selected based on the topic that was part of the emergent design and varied over the course of the four years.

Table 9.1 The stakeholders involved in the multi-stakeholder learning process.

Researchers	Genetics (2 seniors and 1 PhD student)
	Animal behaviour (3 seniors and 2 PhD students)
	Transdisciplinary (1 senior and 1 PhD student)
Stakeholder representatives (Inner-circle)	Animal protection (Senior policy maker)
	Farmer (Chair of Dutch farm branch organization)
	Food industry (Corporate director)
	Genetic industry (Researcher)
Society at large (Outer-circle)	Animal health
	Animal nutrition industry
	Animal protection organization
	Branch media
	Breeding industry
	Food industry

Government
Husbandry design
Knowledge institution (university, agricultural institutions, consultancy)
Politics
Retail
Individuals:
Citizens
Farmers

At least one ILA-loop per year was conducted. Each loop resulted in shared activities, which were also reflected upon, often becoming the starting point of a new loop. A typical loop started with inventorying who to involve (ILA-Phase 1), followed by consulting 'outer circle' stakeholders (ILA-Phase 2). This data was then used as input for one or more dialogue sessions, in which the researchers deliberated together with the 'inner-circle' stakeholders on future research directions (ILA-phase 3). The aim of the sessions was to induce reflection by making similarities and differences explicit, and subsequently explore options for a shared vision. After these sessions, one or more dialogue sessions and supervision meetings were organized to operationalize derived insights (ILA-phase 4). Each cycle resulted in shared science–society learning activities such as the organizing of a symposium, farm visits and the writing of a brochure (ILA-phase 5). These activities aimed to bring about societal embedding of the research program, but also had a strong interventionist character as they aimed to stimulate second-order learning among all the participants.

Overall analysis and validation

Of all interventions were member checks conducted to validate the results: during interventions we summarized information and during the analysis we asked for feedback after sending summaries and/or reports. In addition, we led the researchers comment on a final version of the paper that describes their learning process. The interviews, focus group sessions and dialogue sessions in this learning process were recorded and documented by verbatim transcripts to ensure rich data. In this study, conclusions are based on combinations of interviews, observations of the dynamics during interventions, evaluations with participants and/or literature study.

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An extensive evaluation of the first three years of the learning process, including all past interventions, was conducted with the researchers (month 35/November 2012), consisting of a questionnaire survey and an in-depth interview lasting approximately one hour. The questionnaire was related to: a) the aim and execution of the research project; b) inter- and transdisciplinary learning; c) the different types of stakeholders who were involved; and d) animal welfare aspects (a total of 19 sub-topics). The researchers were asked to what extent their vision or acts related to these topics had changed during the project and what they thought they had learned. They were also asked to indicate how they had received past educational interventions and what role they had in their learning process. The results of the questionnaire survey were discussed extensively in the in-depth interviews to gain insights into the learning process of the researchers, their experience with interdisciplinarity and science-society activities, and stimulating or hampering factors in inter- and transdisciplinary learning.

9.3 Lessons learned

Here we discuss lessons learned based on all passed interventions that were part of the learning process. In the following sections, we discuss for each lesson learned separately how it derived from our results and its implications for the design of multi-stakeholder learning processes in general.

9.3.1 Lesson 1: Designing of eye-opening sessions

Animal welfare in pig production is a context in which there is a tradition of conflict, and therefore demands a high degree of reflection. The learning interventions as part of the learning process were therefore reflective in nature. During interventions, such as dialogue sessions with the inner circle stakeholders) different issues and topics were addressed and discussed, such as for instance the terminology related to (social) behaviour of pigs, and opportunities versus threats of the novel breeding strategy (For an extensive discussion of the learning process of the researchers, see: (Benard & De Cock Buning, 2014)).

Consequently, part of the research has been directed towards the values and preferences of stakeholders. They indicated, for instance, that not only attention should be paid to negative social interactions between pigs, but also to positive social interactions and emotions. Also the research objective was refined after discussion with societal stakeholders as answer to the societal concerns that pigs do not need changing, but that there is a need to change husbandry conditions instead. The researchers emphasized more that animal welfare is an interaction of the animal and the environment. The researchers argued that also in systems where pigs have more space and rooting materials (e.g. on organic farms), outbreaks of injurious biting (e.g. ear- or tail biting) occur and complementary strategies, like breeding for social pigs, are probably needed to successfully battle these undesired behaviours and their consequences. Breeding for certain pig characteristics can fasten the transition towards a more animal friendly production sector, as aimed for by the Dutch government and agricultural section by 2023[22].

The researchers had initially often taken for granted assumptions that supported their stay in the comfort zone where there is no need to undertake action (e.g. "*we have a shared perspective on animal welfare, and therefore we do not need to discuss*"; "*I think it is the responsibility of the other and not me*"; "*I think it is the other who has a wrong understanding and not me*"). Based on the extensive evaluation of all passed interventions (e.g. dialogue sessions, courses, interviews etc.) by the researchers on their successfulness, it appeared that learning interventions were most successful when different perspectives are used to problematize the issue at stake and to create an eye-opening effect. Often, due to the inherent explorative nature, the researchers had difficulties to operationalize the derived insights of the learning interventions, for example because the issue at stake was too big or not concrete enough. Therefore, from a facilitators perspective, it is key to discuss an issue that is manageable and can be translated to direct actions (self-efficacy), or to plan a follow-up session.

[22] http://www.government.nl/issues/agriculture-and-livestock/livestock-farming.
Last retrieved in April 2014.

Based on the evaluation, three design principles could be formulated that contributed to successful reflective learning interventions:

- an experienced contrast ('shock')
  Using different perspectives of stakeholders to show the unusual in what is taken for granted or to show the wide disparity between what is expected and what the real situation turns out to be, in particular on issues or activities close to the interests of participants.
- a lively setting ('direct experience')
  Providing a real-life personal confrontation with different perspectives, or by using tools such as role-play or film fragments and documents based on quotes of other stakeholders.
- controllability ('in control')
  The researchers often did not know how to operationalize derived insights by the learning process in their own projects. Therefore, an intervention was additionally valued as useful when it provided opportunities to undertake directed actions.

Below we show how these three principals were applicable in three interventions (see table 9.3) that were evaluated as successive by the researchers.

Table 9.3 Interventions that were evaluated as successful by the researchers.

I. Farmer symposium (month 27). The researchers organized a symposium (*Peaceful Pigs)* for farmers on their research topic of social pig behaviour and related topics such as tail biting. They lectured about the relevance of social behaviours for the growth, health and welfare of pigs and how it can be affected in several ways, through environmental, breeding and rearing conditions. (The next section elaborates more extensively on this symposium)
II. Definition quiz (month 11). This intervention aimed to stimulate the researchers to discuss the different framings and assumptions behind their key research concepts. We presented the results of an interview round with a broad spectrum of stakeholders about different types of social pig behaviour and its definitions. From the sixteen social behaviours that were the focus of the interviews, three were selected for discussion in the session: (a) social skills, b) social support and c) aggression. In a PowerPoint presentation, the concepts were introduced one by one with five different definitions that interviewees had given. The participants (the researchers and stakeholder representatives) in the session voted for the definition that corresponded best with their own definition, and were given 15 minutes to discuss the different choices made. The last 15 minutes of this part of the session were used to reflect on the meaning of the outcomes for the researchers in the program.
III. Feedback session (month 38). The researchers had written a brochure to present their perspective on societal questions and concerns on their research program. We organized 4 focus groups with citizens (N=21), in which we let them read the folder and asked them to estimate on an axis how desirable and feasible the research program and its breeding strategy were. After discussing the different reactions, we let them fill in the axis again. In this way, it became clear that most citizens started positively but ended negatively. During the intervention with the researchers, we presented these results and let them come up with possible argumentations of citizens. Then we illustrated the actual argumentation of the citizens by a role play of some sections of the transcripts. We ended by asking the researchers for their first reaction and implications for the project.

The farmer symposium provided a 'direct experience' in which the researchers were personally confronted with a group of critical farmers. The definition quiz was set up as an interactive quiz setting in which researchers and stakeholder representatives were confronted with perspectives of each other and a broad range of stakeholders. This was valued as renewing and fun. The feedback session provided a direct experience because the way of arguing of citizens was made comprehensible by using a role play that was based on quotes of the citizens' focus group. This session showed that a 'direct experience' does not necessarily mean a face-to-face meeting, but that other methods that represent the other perspective realistically are sufficient too. We experimented successfully with methods as film material, or role-plays and documents based on quotes of other stakeholders (see paper D). In contrast, interventions in which the perspectives of others were presented without a lively experience (e.g. summarized or simplified) were less successful.

The farmer symposium gave a 'shock' because the gap between the perspectives of the researchers and some farmers on animals and their welfare was bigger than expected. The researchers realized that their validated scientific knowledge was not being taken for granted by others and that it has limited power in bridging this gap in perspectives.

> PhD student 4: *"I imagined from the start of the project that it is important that science links with practice, but it was actually at the symposium that it emerged as really important."*

Prior to the definition quiz, the researchers thought definitions on research concepts were shared between stakeholders and within science. However, it showed that definitions are far from shared: they appeared to differ, even within the same research group.

> Senior researcher 3: "*That was a very informative intervention. That suddenly everybody had different definitions. Also on behaviours where you think of 'Help, we aren't in this case even talking about the same thing'. That was shocking for me. I thought that when I was talking about aggression, everybody understood what I meant, but that was certainly not true.*"

The feedback session did not show only attitude of citizens towards the research program of the researchers, but also the underlying argumentations were revealed. These were unexpected by the researchers.

PhD student 4: *"I in particular remember the one where you did a role play where I really thought of 'Wow, I did not realize that citizens say such things and that they discuss the brochure in such a way'. It was really informative to let us hear that."*

In particular the farmer symposium and definition quiz provided a feeling of 'in control'. At the farmer symposium, farmers explained what scientific knowledge they were looking for (e.g. more detailed information or specific information, such as on the relation between climate and pig behaviour). In the definition quiz, the issue of different definitions of research concepts could be relatively easily solved by discussing and defining research concepts together.

9.3.2 Lesson 2: Organizing learning at the level of the praxis

The learning process revealed a gap in the perspectives of the researchers and farmers on social pig behaviour and the societal relevant theme of tail biting between pigs. This is a multi-factorial problem from which scientific research states that the absence of suitable enrichment materials for rooting and chewing is a major risk factor. This is because pigs are, even when provided with food, still highly motivated to display appetitive foraging and exploration (Moinard et al., 2003). One of the shared science-society learning activities of the research team was the organizing of an interactive symposium (*Peaceful Pigs)* for farmers on what is already described in the scientific literature. The farmers were invited by an open announcement placed in the sector specific communication channels. In addition the PhDs spread brochures at the yearly meeting of pig farmers sector, and randomly approached farmers.

The first part of the symposium was based around four presentations of four of the animal science researchers. The second part included a workshop to gain insights in the knowledge needs of farmers, so societally relevant research questions could be distilled. Although directed to pig farmers, other professionals from the sector were also present (N=37). The four most critical farmers were asked to participate in follow-up one-to-one dialogue sessions with the researchers to understand the encountered critics, i.e. the origin of the different perspectives and to stimulate mutual analysis and learning (for a more detailed description of the learning process as effect of the symposium and dialogues, see Benard et al., (2013)).

At the farmer symposium, farmers and researchers disagreed on the causes of tail biting and some farmers were only moderately open for scientific knowledge. This was partly caused by the relatively low degree of usability of scientific facts. They were frequently not concrete enough, too uncertain or not relating to the real world context of the farmers.

Another reason, which we will elaborate upon here was the lack of recognition of scientific observations by farmers in their own husbandry. The participating farmers had their own observations on which they based their perspective. This appeared to be caused by a different praxis, which we understand as the way of handling and understanding the environment or the *usual practices* coherent with professionalism.

For example, the farmers and researchers used different indicators for their measurements of welfare (farmers: primarily production numbers and health status, versus researchers: primarily behaviour observations and physiology), resulting in a different interpretation of the welfare status of pig. However, there appeared to be more differences in observing: researchers seemed to perceive groups of pigs by a reductionist approach aiming at control and measurement, while farmers seemed to perceive pigs by a holistic approach, scanning several hundred pigs in their stable for abnormalities. Consequently, researchers presented facts on individual pigs, which were not recognized by farmers in their husbandry. In a similar way, farmers had facts based on group dynamics, which were not recognized by researchers. A different praxis means also different environmental contexts (e.g. different conditions, breeds, enrichment material), also resulting in different key observations on animal welfare and tail biting. In the following quote a farmer questions whether exploring is a behaviour that needs to be fulfilled, while for the researchers this was an important requirement, in order to prevent tail biting. The pigs of the farmers had only limited exploring options, but nevertheless tail biting occurred rarely.

> Farmer: "*Research becomes plausible when I see it back in my husbandry. Recently I had since a long time a tail biter, but if I have 1,000 pigs and only one starts tail biting, then you start wondering, do they really need it* [fulfilling exploring behaviour]? *If it is only one who bites tails?*"

At the farmer symposium, some farmers questioned the objectivity of the researchers, because they gave "human norms" to the pigs. For example, some farmers did not believe in the term boredom, which was for the researchers an important cause of tail biting. This was caused by a different interpretation of the same behaviour.

Researcher: *"The pigs in farrowing pens are bored. They are just standing and show boredom. They start tail biting and other bite behaviour."*
Participant: *"That is resting, not boredom."*

Observing differences among animal researchers (N=18) and pig farmers (N=11) were therefore studied more in depth in an additional study (for a more detailed description of the set-up of this experiment and its results, see Duijvesteijn et al. (2014). Also urban citizens (N=15) were included as they were expected to have a different framing and way of handling pigs. They were asked to observe the behaviour of a pig on nine videos and to score for each video 21 given terms on moods, such as *happy* or *irritated*, i.e. the Qualitative Behaviour Assessment (QBA) approach. The results of the QBA showed that pig farmers observed the behaviour of pigs systematically more positively than the urban citizens and animal researchers. Urban citizens and animal researchers observed the behaviour of pigs in line with each other. Intra-observer analysis indicated that the differences were likely not due to interpretation of the terms. From the additional questionnaire appeared that the farmers framed pigs primarily as production animals (similar to the farmers that participated at the symposium), while the citizens and researchers primarily as sentient beings.

This study underlined that observing differences might hamper the development of a shared understanding of pigs and their welfare and that there is a need to address observing differences during multi-stakeholder learning processes. A fruitful strategy seems the step into each other's praxis and to organize dialogues sessions at a highly material level, at the first-order notions. This makes differences in observing explicit and inescapable, and forces each other's way of observing to become "calibrated". These strategies prevent competing against each other's statement ("*I am right, tail biting is caused by X, because I observed X*" versus "*No, I am right, tail biting is caused by Y because I observed Y*") and create opportunities to address the discrepancies at a second-order learning level.

To test the potential of addressing observing differences in multi-stakeholder processes, we organized a second farmer symposium (*View on Tail Biting*) on tail biting in which observing differences received a central place (month 42). The design was essentially different from the previous one, and was therefore not announced as a symposium, but as a master class. It contained a workshop of which the aim was to gain concrete tools and insights from practice and science on how to signal tail biting in an early stage, by learning from each other's way of observing.

There were four rounds: a) tail biting and tail posture, b) tail biting and explorative behaviour, c) tail biting in the early stages of life, and d) what learned during the workshop. In the first three rounds, a series of different related pig behaviours were shown in short film fragments, and in the third round also pictures of tails with different degrees of tail biting. The participants in the workshop voted for the film fragment and photo that showed tail biting, and were given 15 minutes for a facilitated discussion on the different choices made. The participants (N=48, of which 10 farmers, 12 farm advisors, 6 researchers and 20 others professionals in pig husbandry) were divided over four round tables and in each table one was assigned to present their main results to the other groups.

Especially in the groups where the participants were optimally balanced in different backgrounds and professionalisms, observations between them differed and a lively discussion emerged. The participants differed in the interpretation of shown behaviours (e.g. resting versus bored; playful versus aggressive; exploring versus biting) and if these behaviours were problematic and/or precursors of tail biting. They also used different indicators (e.g. position of the tail or the eyes, activity in the pen, colour of the skin, noises) and had different perspectives on the pictures showing tails with different degrees of tail biting. The evaluation form was filled in by only 16 of the participants, but they evaluated the master class generally positively.

9.3.3 Lesson 3. The need of a fair share

The first symposia revealed that the participating farmers were reluctant to implement presented alternatives to tail docking by the researchers. This was partly caused by the fact that the success of these alternatives could not be guaranteed by the researchers. There was a risk that this would lead to an increase in frequency and seriousness of tail biting, while those potentially extra costs would be for the farmers only. Therefore, the farmers stated that scientific facts alone do not change the current praxis. Instead, addressing problems integrated, which means fairly sharing the responsibilities and searching together for shared solutions, so called win-wins, is required to engage farmers in dialogue. To reduce insecurities on potential risks, another part of the second symposium (*View on Tail Biting*) was 'lessons from practice', which included an interview with a farmer who was able to keep undocked tails. He shared his experiences on what were good strategies and what not. Also a panel discussion was included with the *Curly tail group (Werkgroep Krulstaart)*. This Dutch initiative united more than 8 representatives of a broad range of organizations

including farm branch, animal welfare, research, government, feed industry, meat industry and genetic institute, which started on its own to search for integrated strategies to stop tail docking under threat of future EU regulation. The farmers evaluated it positively to get the ability to discuss with them the issue of tail biting. It gave them a positive feeling to become aware that other parties throughout the production sector were taking the issue of tail biting seriously.

9.4 Discussion

Central in this paper, was the research program *Seeking Sociable Swine*. This was a transdisciplinary program directed to animal welfare in pig production. This paper aimed to provide insights on how to design and facilitate multi-stakeholder learning processes, so it will most constructively supports mutual learning with respect to animal welfare.

The design of the multi-stakeholder process was tailor made for animal welfare improvement in pig husbandry, which stands at the same time as an example for controversial or *wicked* issues. Wickedness and controversy can frequently be found in research contexts, but also in policy contexts. The insights of this study have therefore a broader relevance than for animal welfare improvement in pig husbandry alone. They can be used to structure more efficiently tailor-made designs in other interactive science and society innovation processes and in interactive policy making (Driessen et al., 2001), where needs to be dealt with wickedness.

The research was restricted to animal welfare in pig production. However, from other animal welfare programs that were also granted by the NWO program *The Value of Animal Welfare* appeared that other animal production systems (e.g. broiler chickens, laying hens, veal, fish) have comparable animal welfare issues and similar dilemma's (e.g. animals' natural behaviour needs versus economic interests), the same potential value-conflicts (e.g. animals framed primarily as an end in itself or as a means to an end (food)), and similar difficulties with knowledge transfer on animal welfare from science to practice. The results of this thesis are therefore relevant for other animal production systems too.

From this study, the follow three guidelines for the designing and facilitating of multi-stakeholder processes could be distilled:

- Lesson 1: Designing of eye-opening sessions;
- Lesson 2: Organizing learning at the level of the praxis;
- Lesson 3. The need of a fair share of responsibilities.

In lesson 1 we showed how a confrontation with different perspectives stimulated learning, as long as three key principles were taken into account: 'shock', 'direct experience' and 'in control'. A 'shock' can be seen as a second-order experience from which in literature is stated that it can be used as an intervention to stimulate frame reflection. Percy (2005) describes second-order experiences by combining work by different scholars: "*it often involves disorientation (Mezirow), surprise (Schön), or recognition of ignorance (Revans) – elements which challenge the first order experience and lead to reconsideration and modification of that experience or knowledge"*. A 'direct experience' is in line with Kolb's theory on experiential learning, which can be simply defined as "learning by doing" (Armitage et al., 2008). Kolb describes it as the process of knowledge creation "*through the transformation of experience*". The core is a learning cycle where personal experiences form the basis for reflection, followed by abstract conceptualization and active experimentation (Kolb, 1984). The importance of personal experiences and acquiring knowledge oneself is underlined in cognitive psychology and forms the basis for much adolescent and adult education, including problem-based learning. Here, it is acknowledged that knowledge cannot be transferred but only acquired actively, and that knowledge gained in the context of a real-life situation is remembered and used better (Murphy, 1997). People have difficulty accepting a problem for which they do not know a solution, showing the need of the third principle. Controllability influences whether or not a person experiences stress: the better a person can control situations, the less stress they experience (Miller, 1979).

Lesson 2 teaches that because of differences in framings and praxis's, people have different observations – or experiences – on which they base their perspective. During daily practises, learning tends to be limited to a first-order level, the skills and capabilities with the profession, in which underlying framings are taken for granted (Schön, 1983). To increase the chance of creating solutions that match the diversity of societal perspectives, learning should take place at a second-order level, the frame of reference that steers daily activities and influences perspectives (Schön and Rein 1994). Multi-stakeholder learning processes aim therefore second-order learning (Grin & van de Graaf, 1996; Schön and Rein 1994). The second conclusion of this paper is that second-order learning might be better or faster

realized by a shared reflection on first-order notions. Frequent mutual visits to each other's local environment to become aware of each other's praxis, which is understood as the way of living, handling and understanding the environment, helps to make differences explicit and difficult to ignore and to escape from. This motivates internal team members and external stakeholders to address the discrepancies at a second-order learning level. The literature states that personal experiences are difficult to refute in particular. This is because it raises an uneasy feeling as if suggesting that the person who makes the claim based on a personal experience is lying (Aarts & Molder, 1998; Aarts & Woerkum, 2010). Personal experiences are therefore strong enhancers of reflection. Our strategy was to step into each other's praxis and gain insights into the origin of each other's experiences and perceptions or to have the discussion at a material level. Broerse (2010) observed in hindsight over various dialogue studies in the heath domain (researchers, patients , doctors) that the willingness for mutual learning increases when concrete experiences and stories are exchanged instead of abstract knowledge.

Lesson 3 teaches that a fair share of responsibility and the creation of a safe status quo is needed to create commitment among participants in multi-stakeholder dialogues. In literature is stated that learning is stated only to take place when negative feelings linked to insecurity can be reduced. When there is no opportunity for a new (economically) safe status quo, as was the case with the farmers that were expected to stop tail docking, learning processes are not likely to be sufficient (Ten Bos, 1998; Aarts & Woerkum, 2010). This underscores the need of an integral approach as suggested in lesson 3 in order to create a supportive environment in which there is room for mutual learning.

Conclusion